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(71) Applicant *(for all designated States except US)*: **TOUMAZ TECHNOLOGY LIMITED** [GB/GB]; Building D5, The Innovation Centre, Cullham Science Centre, Abingdon, Oxfordshire OX14 3DB (GB).

(72) Inventors; and
(75) Inventors/Applicants *(for US only)*: **SIM, Calvin** [SG/GB]; 46B Bramham Gardens, London SW5 0HQ (GB). **TOUMAZOU, Christofer** [GB/GB]; 8 Barrett Street, Oxford, Oxfordshire OX2 0AT (GB).

(74) Agents: **MARKS & CLERK** et al.; 4220 Nash Court, Oxford Business Park South, Oxford, Oxfordshire OX4 2RU (GB).

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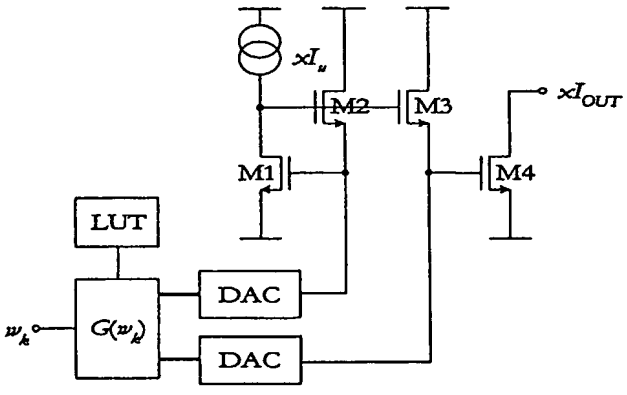
(54) Title: CONFIGURABLE FUNCTION IMPLEMENTING SYSTEM AND DIGITAL TO ANALOGUE CONVERTERS



(57) Abstract: Apparatus for converting an M-bit digital signal into an analogue signal. The apparatus comprising means (12,13) for mapping the M-bit digital signal to first and second digital values, so that the ratio of the first to the second digital value is equal to or approximates the value of the M-bit digital signal. First and second digital to analogue converters (14,15) are provided, the first digital to analogue converter (14) having an input for receiving said first digital value and the second digital to analogue converter (15) having an input for receiving said second digital value. Circuit means (16) is coupled to the analogue outputs of the digital to analogue converters (14,15) for dividing one of the analogue outputs by the other, and for providing the result to an output.

WO 2004/042931 A3

INTERNATIONAL SEARCH REPORT

PCT/GB 03/04828

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H03M1/66 G06J1/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H03M G06J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, PAJ, INSPEC, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 439 623 A (FUJITSU LTD) 7 August 1991 (1991-08-07) column 4, line 20 - column 6, line 29; figure 3	1-5
X	PATENT ABSTRACTS OF JAPAN vol. 007, no. 148 (E-184), 29 June 1983 (1983-06-29) -& JP 58 060821 A (HIOKI DENKI KK), 11 April 1983 (1983-04-11) abstract; figure 1	1-5
X	PATENT ABSTRACTS OF JAPAN vol. 005, no. 176 (E-081), 12 November 1981 (1981-11-12) -& JP 56 102118 A (HITACHI LTD), 15 August 1981 (1981-08-15) abstract; figures 1-4	1-5

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
8 April 2004	29. 07. 2004

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Nicolaucig, A

Form PCT/ISA/210 (second sheet) (January 2004)

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	VELIXON J M: "TRANSMISSION COEFFICIENT CORRECTION FOR DACS" IEEE DESIGN & TEST OF COMPUTERS, IEEE COMPUTERS SOCIETY. LOS ALAMITOS, US, vol. 13, no. 4, 21 December 1996 (1996-12-21), pages 34-39, XP000682966 ISSN: 0740-7475 page 34 - page 36	1-5
A	US 6 157 334 A (KIMURA MUTSUMI) 5 December 2000 (2000-12-05) figures 1,3,4 column 1, line 39 - column 2, line 62	1-5
X,P	SIM C ET AL: "Power efficient scalable precision rational digital to analogue converters" PROCEEDINGS OF THE 2003 IEEE INTERNATIONAL SYMPOSIUM ON CIRCUITS AND SYSTEMS (CAT. NO.03CH37430), ISCAS 2003. INTERNATIONAL SYMPOSIUM ON CIRCUITS AND SYSTEMS, BANGKOK, THAILAND, 25-28 MAY 2003, pages I-905-8 vol.1, XP002275781 2003, Piscataway, NJ, USA, IEEE, USA ISBN: 0-7803-7761-3 the whole document	1-5

2

INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB 03/04828

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

see annex

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.

☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-5

Apparatus (and corresponding method) for converting an M-bit digital signal into an analogue signal, the apparatus comprising:
means for mapping the M-bit digital signal to first and second digital values, so that the ratio of the first to the second digital value is equal to or approximates the value of the M-bit digital signal;
first and second digital to analogue converters, the first digital to analogue converter having an input for receiving said first digital value and the second digital to analogue converter having an input for receiving said second digital value; and
circuit means coupled to the analogue outputs of the digital to analogue converters for dividing one of the analogue outputs by the other, and for providing the result to an output.

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2. claims: 6-17

Apparatus (and corresponding method) to evaluate a function, the apparatus comprising:
a plurality of scaling elements, each scaling element having a first input for receiving an analogue input signal, a second input, and an output;
control means for generating a digital weight for one or more of said scaling elements, and having output means for applying generated weights to the second inputs of respective scaling elements;
output means having a plurality of inputs coupled to outputs of respective scaling elements to receive scaling products therefrom, a plurality of outputs selectively coupled to respective inputs, and means for selectively coupling inputs or outputs together, the control means being coupled to the output means for effecting the selective coupling.

INTERNATIONAL SEARCH REPORT

Information on patent family members

PCT/GB 03/04828

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0439623 A	07-08-1991	JP 3077429 A	03-04-1991
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